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*Elements of Planet 1898 EC.*

Epoch Berlin M. T. 1898, Oct. 18.5

$$M = 284^{\circ} 59' 46''.6$$

$$\omega = 175 \quad 59 \quad 19 \quad .2$$

$$\Omega = 292 \quad 17 \quad 43 \quad .3 \quad \left. \vphantom{\begin{matrix} \omega \\ \Omega \end{matrix}} \right\} 1899.0$$

$$i = 1 \quad 35 \quad 48 \quad .8$$

$$\phi = 6 \quad 17 \quad 1 \quad .8$$

$$\log a = 0.345198$$

$$\mu = 1076''.988$$

$$P = 1203.36 \text{ days.}$$

These elements were computed from one normal place of October 18, (six observations), and single observations of November 3 and November 17, 1898. At the time of discovery the brightness of this planet was estimated at 12.5th magnitude.

MT. HAMILTON, January 16, 1899.

E. F. CODDINGTON.

## PROBABLE PROPER MOTION OF HARVARD A. G. 2577.

This star was used as a comparison star in observations of Comet *b* 1898, along with others on the same nights. Discrepancies in the observations led to a direct comparison of this star with others, and subsequently a reobservation of this star with the meridian-circle by Professor TUCKER. The star's R. A. is found to be substantially the same as that of the A. G. catalogue, but its declination is 6'' less. This difference is probably due to a proper motion of 0''.25 per year, although there is an incomplete observation at Bonn, in 1860, which differs considerably in both co-ordinates from such an assumption.

MT. HAMILTON, Dec. 20, 1898.

C. D. PERRINE.

## COMET DISCOVERIES OF THE YEAR 1898.

In the number of cometary discoveries the year 1898 has surpassed all previous records. Ten comets in all were found during the year, three being returns of well-known members of the solar system, and the remaining seven unexpected. It is worthy of note also that all ten passed perihelion in little more than eight months—between March 20 and November 23, 1898. The Lick Observatory contributed six to this list of discoveries, three of the unexpected comets having been picked up by Mr. PERRINE, and one by Mr. CODDINGTON—the last named by photography—while the rediscovery of WINNECKE's and

WOLF's periodic comets were due to Mr. PERRINE and Mr. HUSSEY, respectively. Of the three remaining new comets one was found by Mr. GIACOBINI, at Nice, one by Dr. BROOKS, at Geneva, N. Y., and one by Mr. CHASE, at Yale. The rediscovery of ENCKE's periodic comet by Mr. JOHN GRIGG, at Thames, New Zealand, on June 7th, completes the list. Five of these discoveries were made between the dates June 7th and June 19th, three of them at the Lick Observatory in less than a week.

According to DENNING, the largest number of comets found in any previous year is eight, that many having been found in 1858. Nine comets passed perihelion in 1886, but two were found in 1885 before coming to perihelion, and one in January, 1887, after perihelion passage.

Aside from their number, the cometary discoveries of the past year are interesting for several other reasons. Previous to 1898 only two comets had been discovered by photography,—BARNARD'S, in October, 1892, and SCHAEBERLE'S, on the plates of the total solar eclipse of April, 1893. The former of these only was verified by later visual observation. The year 1898 adds two more to the list of photographic discoveries, CODDINGTON'S and CHASE'S, both being afterward observed visually. CODDINGTON'S comet was so bright that an independent visual discovery of it was made three days later by W. PAULY, at Bucharest; but CHASE'S, which was found on plates exposed to photograph the *Leonid* meteors, on November 14th, was so faint that it would in all probability have escaped visual discovery.

Again, at least two of the comets of the year bear close resemblance in their orbits to comets of previous years, as has been pointed out in previous numbers of these *Publications*.\* Comet *b* (PERRINE), for which PERRINE finds a period of 305 years, apparently belongs to the same family as the comet of 1684, and 1785 I; and the resemblance between the orbits of Comet *i* (BROOKS) and SCHAEBERLE'S Comet of 1881 is remarkable.

But the most interesting point to many minds in the year's cometary work is the accurate agreement between mathematical calculation and the actual motion of a comet shown in the rediscovery of WOLF's periodic comet. From observations made during previous apparitions, THRAEN computed the definitive elements of the comet's orbit, and upon these based the com-

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\* See Nos. 62, p. 118, and 65, pp. 243, 250.

putation of its path during the present apparition, taking into account, of course, the perturbing influence of the planets. So well was his work done, and so accurate the theory upon which it was based, that the comet was found by HUSSEY within 1<sup>s</sup> of Right Ascension, and 4'' of Declination, of the predicted place.

The following tabulation gives the comets of the year in the order of their perihelion passage, the discoverer, and the date of discovery:—

Comet.	Discoverer, and Date of Discovery.	Remarks.
I	PERRINE, . Mar. 20	Elliptic; with period of more than 300 years.
II	PERRINE, . Jan. 2	WINNECKE's periodic comet; period, 5.8 years.
III	GRIGG, . . June 7	ENCKE's periodic comet; period, 3.3 yrs. Independently discovered, June 11th, by TEBBUTT, from whom the first announcement of discovery was received.
IV	HUSSEY, . June 16	WOLF's periodic comet; period, 6.8 yrs.
V	GIACOBINI, June 19	
VI	PERRINE, . June 14	
VII	CODDINGTON, June 11	By photography. Independently discovered visually by W. PAULY, at Bucharest, on June 14th.
VIII	CHASE, . Nov. 14	On meteor plates; announcement made Nov. 24th.
IX	PERRINE, . Sep. 13	Independently discovered by M. P. CHOLFARDET, at Besançon, on Sept. 14th.
X	BROOKS, . Oct. 20	

January 9, 1899.

R. G. AITKEN.

#### THE PROBABLE STATE OF THE SKY ALONG THE PATH OF TOTAL ECLIPSE OF THE SUN, MAY 28, 1900.

The observations taken under the direction of the United States Weather Bureau in 1897, to determine the meteorological conditions likely to prevail along the path of the total eclipse of the Sun, which will occur in the Southern States on May 28, 1900,\* were repeated this year on precisely the same plan. In general, the work was done by the same observers, and eighty-seven stations reported this year as against sixty-six last year.

The results, which are summarized by Professor BIGELOW in the *Monthly Weather Review* for September, 1898, lead to the

\* See abstract of Professor BIGELOW's Report in No. 60 of these *Publications*.